Recovery Plan Recommendations

The recovery plan for the Pahrump poolfish, titled Recovery Plan for the Pahrump Killifish was completed by the Service in 1980 (USFWS, 1980b). The Recovery Plan prime objective: To restore the Pahrump killifish to non-endangered status by establishing at least three viable, reproducing populations.

1. preserve and protect existing transplanted Pahrump killifish populations and their habitats.
2. Establish and protect viable self-sustaining Pahrump killifish populations in suitable new or restored habitats.
3. Conduct ecological studies and apply findings to management of Pahrump killifish and its habitats.
4. Delineate essential habitat for species preservation.
5. Enforce laws and regulations protecting the Pahrump killifish and its essential habitat.
6. Inform public of Pahrump killifish Status and Recovery Plan objectives.

In 1993, the U.S. Fish and Wildlife Service proposed reclassification of the Pahrump poolfish from endangered to threatened status. Because the Pahrump poolfish occurs in only one stable population, and because all the poolfish populations are subject to various immediate, ongoing, and future threats, the USFWS found that the species continues to be in imminent danger of extinction and withdrew the proposal in 2004 (69 FR 17383).

Railroad Valley springfish, *Crenichthys nevadae,* (T)

Status

On March 31, 1986, the Railroad Valley springfish was designated as threatened by the U.S. Fish and Wildlife Service (51 FR 10857). Within the areas covered by the listing, the species is only known to occur in Nevada. A Recovery Plan for the Railroad Valley springfish was completed in 1997 (Railroad Valley Springfish Recovery Plan, USFWS, 1997a).

Life History

The Railroad Valley springfish is under the genus Crenichthys. The average total length of the Railroad Valley springfish varies between .9-1.5 inches, depending on the spring it inhabits ("Railroad Valley Springfish"). The Railroad Valley springfish has a chunky body that is two-thirds as wide as deep, a very large head and it lacks pelvic fins. It varies from yellow to olive to gray on the top half of the body with a dark stripe extending along the dorsal surface (USFWS, 1997a).

Railroad Valley springfish spawning has never been observed. Spawning at Big Warm Spring, although never actually observed, probably occurs from March through November. Spawning in the outflow for Big Spring, although never observed, presumably occurs during the autumn, winter, and spring months ("Railroad Valley Springfish").

The Railroad Valley springfish is the only fish species native to the thermal spring systems of Railroad Valley, Nevada. They require thermal spring habitats with water temperatures ranging from 29° to 36° C and adequate supplies of aquatic vegetation and invertebrates (USFWS, 1997a). They are opportunistic feeders, feeding primarily on filamentous algae in the spring, and animal foods in the summer ("Railroad Valley Springfish").

Critical Habitat/Historic Distribution and Abundance

The Railroad Valley springfish still occur in all six known historical habitats. These include four thermal springs near Locke's Ranch (Big, North, Hay Corral, and Reynolds) and two thermal springs on the Duckwater Shoshone Indian Reservation (Big Warm and Little Warm), Railroad Valley, and Nye County, Nevada. Portions of the outflow from Big Warm Spring and Little Warm Spring cross public land and flow into Duckwater Creek which historically supported the Railroad Valley springfish. They have also been introduced into Chimney Springs, a seepage area which forms small thermal ponds at Sodaville, Mineral County, Nevada and into unnamed springs at the source of Hot Creek Canyon (51 FR 10857).

Population estimates for the Duckwater Indian Reservation have never been made. The population estimates for Big Spring suggest a downward trend. The population at Sodaville is declining as open water habitat becomes overgrown with emergent aquatic vegetation ("Railroad Valley Springfish).

Critical habitat for the Railroad Valley springfish was designated in 1986 (51 FR 10857) and includes:

1. Nevada, Nye County, Duckwater area. Big Warm Spring and its outflow pools, streams, and marshes and a 50-foot riparian zone around the spring, outflow pools, streams, and marshes. Little Warm spring and its outflow pools, streams, and marshes, and a 50-foot riparian zone around the spring, outflow pools, streams and marshes.
2. Nevada, Nye County, Lockes Area. North, Hay Corral, Big, and Reynolds Springs and their outflow pools, streams, and marshes, and a 50-foot riparian zone around the springs, outflow pools, streams, and marshes.

Threats

All of the springs historically inhabited by the Railroad Valley springfish have been altered by man's activity, and springfish populations have decreased in all habitats throughout the range. The long term threat to the Railroad Valley springfish is the alteration of its thermal spring habitats and the introduction of exotic organisms. Diking of spring pools, diversion of outflows, and channelization of outflow creeks have reduced suitable habitat. Aquatic and riparian habitat around North Spring is subject to trampling by cattle watering in the spring. The spring habitat is further threatened by pumping of underground aquifers, which may result in spring failures. The presence of exotic fishes in the extremely limited habitat is a serious threat to the species. Guppies have become established in Big Warm Spring and nearly eliminated springfish. Development of one

outflow channel of Big Warm Spring as a catfish farm has resulted in escape of catfish into the spring system (51 FR 10857).

Recovery Plan Recommendations

The recovery plan for the Railroad Valley springfish, titled Railroad Valley Springfish Recovery Plan was completed by the Service in 1997. The Recovery Plan recommends that the species may be considered for delisting when:

1. all six historical spring habitats are protected from adverse modification through conservation agreements, easements, or fee title acquisitions; and
2. at least 21,000 adult Railroad Valley springfish are present among the 6 springs, with each population containing at least 1,000 adults and documented annual reproduction and recruitment, for 5 consecutive years. Existing introduced populations should be maintained as refugia, but are not required for recovery.

In 2009, the Service completed a five-year review (USFWS, 2009b) and a Spotlight Species Action Plan for the Railroad Valley springfish (USFWS, 2009h). The Spotlight Action Plan recommended 5 actions to be implemented over the next 5 years to meet the goal of improving the status of the species. The following 5 actions were recommended:

1. Continue to implement and manage habitat restoration at Lockes Ranch to further the expansions of four historical populations.
2. Continue to assist the Tribe in implementation of the Safe Harbor Agreement for Big Warm Spring and with new habitat restoration and management efforts at Little Warm Spring.
3. Develop a standardized, range-wide population survey and estimation protocol and ensure that surveys are completed annually to document species' abundance and distribution, determine population trends, and observe habitat conditions.
4. Determine potential effects of groundwater pumping under existing Southern Nevada Water Authority water right application in Railroad Valley on springfish occupied spring systems and other potential recovery habitats through modeling.
5. Conduct aquatic species and habitat surveys of all springs and streams located on the Duckwater Shoshone Reservation and private lands throughout Railroad Valley to determine presence/absence of native species and evaluate habitat suitability for potential population expansion or establishment.

Razorback sucker, *Xyrauchen texanus* (E)

Status

The razorback sucker was federally listed as endangered on October 23, 1991 (56 FR 54957). A final rule designating critical habitat was published on March 21, 1994 (59 FR 13374). The initial recovery plan for the razorback sucker, titled Razorback Sucker Recovery Plan was completed by the Service in 1998 (USFWS, 1998d). In 2002, the Service prepared an amendment and supplement to the Recovery Plan, titled Razorback Sucker Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan (USFWS, 2002d). The Service initiated a 5-Year review on May 27, 2016 but it is not yet complete (81 FR 33698).

Life History

The razorback sucker is one of the largest suckers in North America and evolved more than 4 million years ago. It can grow up to 13 pounds and exceed 3 feet in length. The razorback sucker is brownish green with a yellow/white belly and has an abrupt, bony hump (or keel) on its back. They have been known to live forty years ("Endangered Colorado River basin fish: Razorback sucker").

The razorback sucker can spawn as early as age three or four. They spawn from February to June. Each female may deposit over 100,000 eggs during spawning. Spawning occurs in the lower basin from January to April and late April to mid-June in the upper basin (56 FR 54957). In the lower basin reservoirs, they spawn over mixed substrates ranging from silt to cobble and water temperatures of 10.5 – 21 °C (59 FR 13374). In rivers, the razorback sucker moves into flooded areas in the spring and begins its spawning migration. Spawning occurs over rocky runs and gravel bars (59 FR 13374).

The razorback sucker eats mainly algae, zooplankton, and other aquatic invertebrates. They are mainly detritivores or herbivores (USFWS, 1998d)).

Critical Habitat/Historic Distribution and Abundance

The razorback sucker historically was found throughout the Colorado River basin primarily in the mainstem and major tributaries of Wyoming, Colorado, Utah, Nevada, Arizona, and New Mexico. In the lower Colorado River basin, razorback suckers occurred from the Colorado River delta upstream to Lees Ferry, Arizona. In the upper Colorado River basin, razorback suckers occurred in the Colorado, Green, and San Juan River basins (USFWS. 1998d).

Remaining wild populations are currently found in small numbers in the Green River, upper Colorado River, and San Juan River subbasins; lower Colorado River between Lake Havasu and Davis Dam; reservoirs of Lakes Mead and Mohave; in small tributaries of the Gila River subbasin (Verde River, Salt River and Fossil Creek); and in local areas under intensive management such as Cibola High Levee Pond, Achii Hanyo Native Fish Facility, and Parker Strip (USFWS, 2002d).

The Service determined critical habitat for the razorback sucker in a final rule published on March 21, 1994 (59 FR 13374). Fifteen river reaches covering about 49% of the historic habitat were designated within the Colorado River basin. This includes portions of the Colorado, Gila, Salt, and Verde Rivers in the lower Colorado River basin. The designated areas contain habitats within the 100-year flood plain that will meet the needs of the razorback sucker as defined by primary constituent elements.

Threats

Razorback sucker populations have been declining much of this century. Decline of the razorback sucker has been associated with major changes in the Colorado River ecosystem. Habitats required by adults include deep runs, eddies, backwaters, and flooded off-channel environments in the spring, runs and pools in summer, and low

velocity runs, pools, and eddies in winter. Threats to the species include streamflow regulation and habitat modification (including cold-water dam releases, habitat loss, and blockage of migration corridors), competition with and predation by non-native fish species, and pesticides and pollutants (USFWS, 2002d).

Recovery Plan Recommendations

The initial recovery plan for the razorback sucker, titled Razorback Sucker Recovery Plan was completed by the Service in 1998 (USFWS, 1998d). In 2002, the Service prepared an amendment and supplement to the Recovery Plan, titled Razorback Sucker Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan (USFWS, 2002d). Downlisting can occur if, over a 5-year period:

1. genetically and demographically viable, self-sustaining populations are maintained in the Green River subbasin and either in the upper Colorado River subbasin or the San Juan River subbasin;
2. a genetic refuge is maintained in Lake Mohave of the lower basin recovery unit;
3. two genetically and demographically viable, self-sustaining populations are maintained in the lower basin recovery unit.

Delisting can occur if, over a 3-year period beyond downlisting:

1. genetically and demographically viable, self-sustaining populations are maintained in the Green River subbasin and either in the upper Colorado River subbasin or the San Juan River subbasin;
2. a genetic refuge is maintained in Lake Mohave;
3. two genetically and demographically viable, self-sustaining populations are maintained in the lower basin recovery unit.

In 2012, the Service completed the 5-Year Review: Summary and Evaluation for the razorback sucker (USFWS, 2012d). The Review recommended revising the 2002 Razorback Sucker Recovery Goals to incorporate information on population dynamics and other relevant information gathered since 2002. In addition, the recovery goal revision should consider the impacts of mercury.

Sierra Nevada yellow-legged frog, *Rana sierra,* (E)

Status

On April 29, 2014, the Sierra Nevada yellow-legged frog was designated as endangered by the U.S. fish and Wildlife Service over its entire range (79 FR 24256). Critical habitat has been designated for the species but Nevada is outside the critical habitat (81 FR 59046).

Life History

The Sierra Nevada yellow-legged from is 1.5 to 3.25 inches long. Females are on average slightly larger than males, and males have a swollen, darkened thumb base (79 FR 24256).

Mountain yellow-legged frogs deposit their eggs in globular clumps, which are

often somewhat flattened and roughly 2.5 to 5 centimeters (cm) (1 to 2 in) in diameter. Egg development is temperature dependent. Tadpoles may take more than 1 year and often require 2 to 4 years, to reach metamorphosis (transformation from tadpoles to frogs) (79 FR 24256).

Mountain yellow-legged frogs currently exist in montane regions of the Sierra Nevada of California. Throughout their range, these species historically inhabited lakes, ponds, marshes, meadows, and streams at elevations typically ranging from 1,370 to 3,660 meters (m) (4,500 to 12,000 feet (ft)) but can occur as low as 1,067 m (3,500 ft) in the northern portions of their range. Mountain yellow-legged frogs are highly aquatic; they are generally not found more than 1 m (3.3 ft) from water (79 FR 24256).

Critical Habitat/Historic Distribution and Abundance

Historically, the range of the Sierra Nevada yellow-legged frog extended in California from north of the Feather River, in Butte and Plumas Counties, south to the Monarch Divide on the west side of the Sierra Nevada crest in Fresno County. East of the Sierra Nevada crest in California, the historical range of the Sierra Nevada yellow-legged frog extends from areas north of Lake Tahoe, through Mono County (including the Glass Mountains) to Inyo County. Historical records indicate that the Sierra Nevada yellow-legged frog also occurred at locations within the Carson Range of Nevada, including Mount Rose in Washoe County, and also occurred in the vicinity of Lake Tahoe in Douglas County, Nevada (79 FR 24256).

Sierra Nevada yellow-legged frog and the northern DPS of the mountain yellow-legged frog are restricted primarily to publicly managed lands at high elevations, including streams, lakes, ponds, and meadow wetlands located within National Forests and National Parks (79 FR 24256).

Threats

The FWS considers the modification of habitat and curtailment of the species' ranges to be a significant and ongoing threat to the Sierra Nevada yellow-legged frog and northern DPS of the mountain yellow-legged frog. Habitat fragmentation and degradation (loss of habitat through competitive exclusion) from stocking and the continued presence of introduced trout across the majority of the species' range is a threat of high prevalence. This threat is a significant limiting factor to persistence and recovery of the species rangewide. Threats of low prevalence (threats that may be important limiting factors in some areas, but not across a large part of the mountain yellow-legged frog complex's range) include dams and water diversions, grazing, packstock use, timber harvest and roads, recreation, and fire management activities (79 FR 24256).

Recovery Plan Recommendations

There is no Recovery Plan.

Warm Springs pupfish, *Cyprinodon nevadensis pectoralis*, (E)

Status
On October 13, 1970, the Warm Springs pupfish was designated as endangered by the U.S. Fish and Wildlife Service over its entire range (35 FR 16047). A Recovery Plan for the Warm Springs pupfish was completed in 1990 (Recovery Plan for the Endangered and Threatened Species of Ash Meadows, Nevada, USFWS, 1990a).

Life History
The Warm Springs pupfish is a small fish. The males have blue on their sides and a black band on the caudal fin. It is primarily distinguished from other subspecies by its high number of pectoral fin rays. All populations are believed to be quite small because of the limited available habitat (USFWS, 1990a).

Spawning occurs most of the year with peak spawning in the spring (April –June) and the size of the populations fluctuates throughout the year. Feeding has not been studied but it is believed that they do not differ substantially from other pupfish in the area (USFWS, 1990a). They are probably herbivores and invertivores (Nature Serve, 2009).

Critical Habitat/Historic Distribution and Abundance
The Warm Springs pupfish inhabits the Warm Springs area of Ash Meadows, Nevada. It lives in a variety of habitats including shallow pools and streams from springs. It occupies six small springs within an area less than 77 square miles. All of its habitats are isolated from other aquatic environments and none of the springs discharge more than 1.17 gal/second. The discharges surface into small spring holes and then flow less than 1.25 miles before disappearing into the soil (USFWS, 1990a).

Critical habitat has not been designated for the species.

The Ash Meadows National Wildlife Refuge was established on June 18, 1984. It encompasses 23,000 acres in Nye County. It was established to protect federally listed endangered plant and animal species. Its goal is ecosystem recovery and species restoration. The refuge is in the habitat restoration state and will be for many years ("Ash Meadows Refuge Quick Facts").

Threats
The vulnerability of the Warm Springs pupfish to alteration and the presence of predatory and/or competing species combine to threaten the pupfish. Species posing a threat to the Warm Springs pupfish include the mosquito fish, crayfish, and bullfrogs. Essential habitat for this species includes 2,240 acres surrounding all of its' habitat. This area is within the borders of the Devil's Hole pupfish essential habitat and represents the area in which groundwater pumping is most likely to adversely affect spring discharge (USFWS, 1990a). Most of the habitat is currently protected as part of the Ash Meadows national Wildlife Refuge.

Recovery Plan Recommendations

The recovery plan for the Warm Springs pupfish, titled Recovery Plan for the Endangered and Threatened Species of Ash Meadows, Nevada was completed by the Service in 1990 (USFWS, 1990a). The Recovery Plan recommends that the species be considered for delisting when the following criteria are met for a five-year period:

1. Criteria shown above for downlisting from endangered to threatened (see Devils Hole pupfish criteria above).
2. Secure, protect, and maintain in natural vegetation, corridors and adjacent buffer areas for gene flow and dispersal of listed plant species within the essential habitat.
3. Native plant communities and aquatic communities have been reestablished to historic structure and composition within all essential habitats.
4. Each individual spring or stream population of Warm Springs pupfish, Ash Meadows Amargosa pupfish, and Ash Meadows speckled dace has sex ratios and juvenile to adult ratios that support self-sustaining populations.
5. The listed Ash Meadows naucorid, the two candidate aquatic insects, and 13 candidate snails are present in all the locales that they have historically occupied.
6. All of the listed plant species and the four candidate plant species are present in all the sites that they have historically occupied.

Virgin River chub, *Gila seminude,* (E)

Status

On August 24, 1989, the Virgin River chub was designated as endangered in the entire range (54 FR 35305). Within the area covered by this listing, this species is known to occur in Arizona, Nevada and Utah. The final rule listing the Virgin River chub as endangered specifically excluded the Muddy River population because at the time it was classified as an undescribed species (65 FR 4141). A Recovery Plan was completed in April, 1995 (Recovery Plan for Virgin River Fishes, USFWS, 1995a). The Service initiated a 5-Year review on May 6, 2014 but it is not yet complete (79 FR 25883).

Life History

The Virgin River chub is an extremely rare, silvery, medium sized minnow occurring in the Virgin River in southern Nevada and averages about 8” in length. It is usually associated with deep, protected areas with large boulders and swift water. It is endemic to 134 miles of the Virgin River in southwest Utah, northwest Arizona, and southeast Nevada (54 FR 35305).

The Virgin River chub spawns during late spring and early summer over gravel and rock substrate. No parental care is provided for the eggs which hatch in one week or less (USFWS, 1995a).

The Virgin River chub are opportunistic feeders, consuming zooplankton, aquatic insect larvae, other invertebrates, debris, and algae. The diet of adults is composed primarily of algae, whereas the diets of younger fish contain more animal matter (USFWS, 1995a).

Critical Habitat/Historical Distribution and Abundance

The Virgin River chub was first collected from the Virgin River in the 1870s. Historically, it was collected in the mainstem from Pah Tempe Springs, Utah downstream to the confluence with the Colorado River in Nevada. Virgin River chubs are most often collected in deep run or pools associated with instream cover. The species presently occurs in only 50 miles of the mainstem Virgin River between Mesquite, Nevada and Hurricane, Utah (54 FR 35305).

Critical Habitat was designated for the Virgin River chub on January 26, 2000 (65 FR 4140). Critical habitat occurs in the 100-year floodplain of the Virgin River from the confluence of Ash and La Verkin Creeks to Halfway Wash, above Lake Mead (87.5 miles). The majority of the land designated as critical habitat is under federal ownership. There is also a population in the Muddy River. The final rule designating critical habitat for the Virgin River chub encompasses only the mainstem Virgin River.

Threats

Threats to the Virgin River chub include habitat changes, water removal, channel alteration, disease, floods, toxic spills and pollution, impoundments, sedimentation, and competition with exotic fishes (especially the red shiner). A large decrease in range and numbers has occurred in the last century, primarily from 1860-1900 when many present water diversions were constructed. The diversions dewatered approximately 35 miles of the chub's habitat. The construction of Hoover Dam and formation of Lake Mead inundated an additional 40 miles of habitat. The species is particularly susceptible to threats because of its limited distribution (USFWS, 1995a).

Preservation of the river channel alone is not sufficient to ensure survival and recovery of the Virgin River chub. The floodplain is integral. Components of a healthy river system needed for these fish include the mainstem channel, where water is maintained most or all year round and upland habitats are inundated during spring flows (USFWS, 1995a).

Recovery Plan Recommendations

The recovery plan for the Virgin River chub, titled The Virgin River Fishes Recovery Plan was published by the Service in 1995 (USFWS, 1995a). The Recovery Plan lists several criteria for downlisting the Virgin River chub. These include: Virgin River flows essential to survival of all life states are protected; degraded Virgin River habitat from Pah Tempe Springs to Lake Mead is upgraded and maintained to allow continued existence of all life stages at viable population levels; and barriers to upstream migration of introduced fishes are established, red shiner is eliminated, and other nonnative species which present a major threat to the continued existence of the fish community are reduced (USFWS, 1995a).

In March, 2008, the Service completed a five-year review of the Virgin River fishes (USFWS, 2008b). Two core populations of Virgin River chub exist, one in the upper river and one in the lower river. They appear to be more tolerant of habitat conditions that limit other Virgin River fishes. They are negatively impacted by the presence of red

shiner and other nonnative fish; however, Virgin River chub are able to persist where they are sympatric. The report recommended no change to the Virgin River chub classification.

Warner sucker, *Catostomus warnerensis* (T)

Status
On September 27, 1985, the Warner sucker was designated as threatened with critical habitat by the U.S. Fish and Wildlife Service (50 FR 39117). The species is endemic to Warner Basin in Oregon and Nevada. A Recovery Plan for the Warner sucker was completed in 1998 (Recovery Plan for the Native Fishes of the Warner Basin and Alkali Subbasin: Warner sucker, Hutton tui chub, Foskett, speckled dace, USFWS, 1998a). The Service completed a 5Year Review: Summary and Evaluation in 2010 (USFWS, 2010b). The Service initiated a second 5Year Review on February 16, 2016 but it is not yet completed (81 FR 7571).

Life History
The Warner sucker is slender-bodied fish that grows to a maximum fork length of 18 inches. The dorsal two-thirds of the head and body are covered with dark pigment which borders to white lower sides and belly. During the spawning season, males develop a brilliant red lateral band along the midline while the female coloration is lighter (USFWS, 1998a).

The Warner sucker is endemic to the Warner Basin, located in south-central Oregon, extreme north-east California and extreme north-west Nevada. They occur in Twelvemile, Twentymile, and Honey Creeks and their associated tributaries as well as remnant lakes in the Valley when filled. They use low to moderate-gradient stream reaches for spawning and rearing. Some are year round stream residents and reach maturity at 3-4 years of age. Historic records indicate that spawning runs of suckers would ascend a tributary stream in the spring and spawn in areas with clean, course gravel. In streams, larvae drift feed on zooplankton and small insects near the water surface, then switch to foraging on algae and associated benthic food items when approximately 2 months old (Kennedy).

Critical Habitat/Historic Distribution and Abundance
The probable historic range of the Warner sucker includes the main Warner lakes (Hart, Crump, and Pelican), ephemeral lakes, sloughs, and lower-gradient streams. It is still known to occur in most lakes, sloughs, and potholes, except during drought years. The Warner sucker occurs in three stream systems and the lakes basin of the Warner Valley and a translocated population of Warner sucker at Summer Lake.

Critical habitat was designated for the Warner sucker to include streams in Lake County, Oregon (Twelvemile Creek, Twentymile Creek, the spillway canal north of Hart Lake, Snyder Creek, and Honey Creek) and associated riparian stream corridor (50 FR 39117). Critical habitat in Nevada was not designated.

Threats

Major threats to the continued existence of native fishes in the Warner Basin and Alkali Subbasin are human induced stream channel and watershed degradation, irrigation diversion practices, and predation and competition from introduced fishes (USFWS, 1998a). Instream barriers and diversion structures have often prohibited the movement of suckers into spawning streams. During years with high precipitation, enough water flows by the diversion structures so that the suckers can use limited reaches of the streams for spawning. If suckers are successful in ascending the barriers, spawned out fish and progeny are likely to be restricted to small areas of streams because of instream barriers, or sometimes diverted into agricultural fields where they die. Any prolonged drought will hasten the demise of the Warner sucker if all or most of the water in the streams is diverted. Channelization of streams and overgrazing have disturbed soils in the watershed and degraded streams by allowing siltation of gravel beds normally used for spawning. Exotic centrarchid and ictalurid fishes have been stocked into lakes in the Warner Basin. Large centrarchids and ictalurids are capable of preying on Warner suckers (50 FR 39117).

Recovery Plan Recommendations

The objective of the recovery plan for fishes in the Warner Basin is to restore and maintain the natural aquatic and riparian habitats of the Basin so that the Warner sucker's continued existence is ensured in its native ecosystem which results in its removal from the list of threatened and endangered species (USFWS, 1998a).

The Warner sucker may be considered for delisting when:

1. A self-sustaining metapopulation is distributed throughout the Twentymile, Honey, and Deep Creek drainages and in Pelican, Crump, and Hart Lakes.
2. Passage is restored within and among the Twentymile Creek, Honey Creek, and Deep Creek drainages so that the individual populations of Warner suckers can function as a metapopulation.
3. No threats exist that would likely threaten the survival of the species over a significant portion of its range.

The 5 Year Review (USFWS, 2010b) included 8 Recommendations for Future Actions:

1. Develop and implement a comprehensive, prioritized screening and passage strategy for the Warner Valley.
2. Reconstruct the fish ladder on Dyke diversion on Twentymile Creek.
3. Work with private land owners to reduce the risk to migrating suckers as they move up and down stream, particularly during and after spawning periods.
4. Work with the Oregon Dept. Fish and Wildlife to develop a long-term management and monitoring plan for the population and its habitat.
5. Collect key life history information, including population age structure, age and size at maturity, longevity, and spawning timing and duration.
6. Evaluate the potential for control of introduced non-native fishes.
7. Evaluate the genetic variability that exists within the stream tributary populations.

8. Evaluate the health of Warner sucker.

White River springfish, *Crenichthys baileyi baileyi*, (E)

Status

On September 27, 1985, the White River springfish was designated as endangered by the U.S. Fish and Wildlife Service over its entire range (50 FR 39123). The species is known to only occur in Nevada. A Recovery Plan for the White River springfish was completed in 1998 (Recovery Plan for the Aquatic and Riparian Species of the Pahranagat Valley, USFWS, 1998b). The Service completed a 5Year Review: Summary and Evaluation in 2012 (USFWS, 2012e).

Life History

White River springfish are moderately sized, averaging 1.2 inches in length. It is one of five subspecies of White River springfishes. Distinctive characteristics of the genus include a lack of pelvic fins, uniserial bifid teeth, a long and coiled intestine and restricted range. There is very little information about the specific life history and habitat requirements of the White River springfish (USFWS, 1998b).

Springfish spawning is described as asynchronous. Most females' average two spawning periods a year and the spawning season of the entire population extends over a long period of time each year. White River springfish spawn year round with peak spawning from April to August (USFWS, 1998b).

Adult White River springfish are found at varying depths from .4 to 1.7 meters but prefer deeper water. Juveniles will use all depths but prefer shallower water and are more vertically dispersed. Larval fish restrict their movement to the top of the water column. All age classes are present in areas of calm water (USFWS, 1998b).

White River springfish are feeding generalists. Springfish forage along the substrate and in plants, as evidenced by the ingestion of bottom-dwelling invertebrates, plant fragments, and detritus. They are only active during the daytime, with peaks occurring in the morning and afternoon. They are uniquely adapted for surviving in environments of extreme temperatures and low dissolved oxygen. The ability of springfish to adaptively thermoregulate by moving in and out of areas of extreme temperatures has enabled them to survive in areas deemed too hostile for other fish species (USFWS, 1998b).

Critical Habitat/Historic Distribution and Abundance

White River springfish are endemic to the remnant waters of the White River system in eastern Nevada. It is only known to occur in Ash Springs, located north of Alamo, Nevada. It is found throughout the Ash Springs pool with infrequent occurrences in the outflow stream. Historically, White River springfish inhabited Ash Springs and its outflow stream and were considered common (USFWS, 1998).

Critical habitat for the White River springfish was designated in 1985 (50 FR 39123) and includes Ash Springs, its associated outflow and surrounding land areas for a distance of 15 meters from the areas in Pahranagat Valley, Lincoln County, Nevada.

Threats

The White River springfish was listed due to habitat alteration, competition and predation by nonnative species. Between 1986 and 1989, Ash Springs was drained annually and algae removed for recreation and swimming. This kept the springfish numbers low. Habitat manipulations stopped though swimming continues. This allowed the White River springfish to establish a stable to increasing population. Introductions of mosquitofish in 1963 and convict cichlid, shortfin molly and sailfin molly in 1964 caused the White River springfish populations to decline and continue to impact the populations (USFWS, 1998b).

Recovery Plan Recommendations

The recovery plan for the White River springfish, titled Recovery Plan for the Aquatic and Riparian Species of Pahranagat Valley was completed by the Service in 1998 (USFWS, 1998b). The Recovery Plan recommends that the species be considered for delisting when:

1. a self-sustaining White River springfish population is present in the spring pools of Ash Spring for three complete generations (or a minimum of 6 consecutive years; and
2. impacts to the species and its habitat have been reduced or modified to a point where they no longer represent a threat of extinction or irreversible population decline.

The 5Year Review concluded that no change to the species status is recommended. The monitoring of White River springfish has been sporadic, most recently qualitative, and the population appears to be stable but remains at depressed levels based on earlier historical accounts. Potential threats from habitat development on private lands seem to have lessened but remains possible. Uncertainties regarding groundwater withdrawal and climate change may pose future threats to the species. Recreational use of Ash Springs pools on public land threatens habitat by affecting bank stability, shoreline vegetation, and water quality. Predation and competition continue to be the greatest threat. Based on the information available, White River springfish remains at risk of extinction because of its restricted range, depressed population, and ongoing threats and it is recommended that White River springfish remain listed as endangered, and we recommend no status change at this time (USFWS, 2012e).

White River spinedace, *Lepidomeda albivallis* (E)

Status

The White River spinedace was federally listed as endangered on September 12, 1985 (50 FR 37194). A Recovery Plan for the White River spinedace was completed in March, 1994 (White River Spinedace Recovery Plan, USFWS, 1994a).

Life History

White River spinedace are the largest of the spinedace, commonly attaining a total length over 120 centimeters. They are also the most brightly colored of the four species of *Lepidomeda.* Information on White River spinedace life history and habitat requirements is scarce. White River spinedace collected during the 1930's occupied spring habitats with clear, cool (18° to 24° C) water. Source pools varied in size from 5-27 meters in diameter. Bottom substrate consisted of gravel and sand with some mud. Emergent aquatic vegetation was common and often dense. The current in the spring outflows and White River was swift to moderate (USFWS, 1994a).

White River spinedace spawning has never been observed and spawning habitat requirements are not known. It appears that spawning occurs during the summer. Their food preferences and feeding habits are also unknown. Preliminary information suggests that they drift feed on invertebrates suspended in the water (USFWS, 1994a).

Critical habitat/Historic Distribution and Abundance

All members of the tribe to which to White River spinedace belongs historically occupied highly localized habitats within the Colorado River drainage system in Arizona, New Mexico, Nevada, and Utah. White River spinedace became restricted to remnant springs and disjunct river section habitats within northern White River Valley. In 1934, the first White River spinedace were collected from the White River, just below the mouth of Ellison Creek. Then they were collected from Preston Big Spring and Nicholas Spring, Lund Spring and an unnamed spring, Indian Spring and the White River downstream from Flag Springs. They appear to have been common to abundant. The species now persists only in Flag Springs, one of three springs designated as critical habitat for this species. The population was estimated at less than 50 individuals in June, 1991 (USFWS, 1994a).

White River spinedace critical habitat encompasses the following springs and their associated outflows plus surrounding land areas for a distance of 15 meters from these springs and outflows:

Preston Big Spring and associated outflow
Lund Spring and associated outflow
Flag Springs and associated outflows

Known constituent elements for all White River spinedace critical habitat include consistent quantities of high quality cool (13 to 21° C) water in the springs and their outflows, vegetation for cover, and insects and other invertebrates for food (50 FR 37194).

Threats

The White River spinedace is endangered because of habitat destruction from channelization of spring habitats and diversion of water, and introduction of nonnative fishes which compete with and/or prey on White River spinedace. Habitats have been

altered since the mid-1800s when the first settlers began diverting water from streams and spring outflows for agriculture and ranching (USFWS, 1994a).

Recovery Plan Recommendations
The recovery plan for the White River spinedace, titled White River Spinedace Recovery Plan, was published by the Service in 1994 (USFWS, 1994a). White River spinedace may be proposed for reclassification to threatened when a self-sustaining population exists in each of the three designated critical habitats for at least 5 years and each habitat is secure from all known threats. The Recovery Plan recommended steps needed to reach recovery include securing, enhancing and maintaining the White River spinedace population at Flag Springs and reestablishing and maintaining White River spinedace populations in Preston Big Spring and Lund Spring.

In 2010, the Service completed the 5-Year Review for the White River Spinedace (USFWS, 2010c). The Service recommended that continued funding be provided to NDOW through Section 6 of the Act, for monitoring of spinedace and continued implementation of the Recovery Plan.

Woundfin, *Plagopterus agentissimus,* (E)

Status
On October 13, 1970 (35 FR 16047), the woundfin was designated as endangered in the entire range, except the Gila River drainage, Arizona and New Mexico. Within the area covered by this listing, this species is known to occur in Arizona, New Mexico, Nevada, and Utah. A recovery plan for the woundfin was completed in July 1979, revised in March 1985, and incorporated into the Virgin River Fishes Recovery Plan in April, 1995 (USFWS, 1995a). The Service initiated a 5-Year review on May 6, 2014 but it is not yet complete (79 FR 25883).

Life History
The woundfin is a small (2.5 inches), silver minnow. Its snout overhangs the small, horizontal mouth. Adult and juvenile wouldfin inhabit runs and quiet waters adjacent to riffles with sand and sand/gravel substrates. Adults are generally found in habitats with water depths between 0.15 and 0.43 meters. Juveniles select areas with slower and deeper water, while larvae are found in backwaters and steam margins often associated with growths of filamentous algae. Spawning occurs during the period of declining spring flows, usually April and May (65 FR 4140)

Woundfins are omnivorous and diets are varied, consisting of insects, insect larvae, and other invertebrates, algae, detritus, benthic and drift animals.

Critical Habitat/Historic Distribution and Abundance
The historic range of the woundfin includes the lower Colorado River (from Yuma upstream to the Virgin River) and Gila River drainages of Utah, Arizona, and Nevada. It occurred in the lower Colorado River basin below the Grand Canyon, the Virgin River in

Utah, Arizona, and Nevada and the lower and middle Gila River drainages is Arizona (65 FR 4140).

The species has been extirpated from almost all of its historic ranges except the mainstem Virgin River from Pah Tempe Springs to Lake Mead. According to the Nevada Natural Heritage Program, the woundfin is found in Nevada in the Virgin River mainstem from the Utah border to just downstream of Riverside (65 FR 4140).

The area designated as woundfin critical habitat by the Service (65 FR 4140) in 2000, is the mainstem Virgin River and its 100-year floodplain, extending from the confluence of La Verkin Creek, Utah to Halfway Wash, Nevada. This includes 37.3 miles of the mainstem Virgin River in Utah, 31.6 miles in Arizona and 18.6 miles in Nevada. This is approximately 12.5% of the historical habitat. The designation of the 100-year floodplain is limited to those portions that contain at least one of the primary constituent elements for critical habitat.

Threats

The major limiting factors for the woundfin today are modification and loss of habitat and the introduction and establishment of nonnative fish, particularly red shiner. The building of dams and associated reservoirs, water diversion structures, canals, lateral, aqueducts, and the dewatering of streams causes loss or degradation of available habitat. The decline in the specie's range and population numbers is due to the physical reduction in available habitats within the various river systems caused by the water projects (USFWS, 1995a))

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Recovery Plan Recommendations

A recovery plan was completed in July 1979, revised in March 1985, and incorporated into the Virgin River Fishes Recovery Plan in April, 1995 (USFWS, 1995a). The woundfin may be downlisted when:

1. Virgin River flows essential to survival of all life states are protected;
2. degraded Virgin River habitat from Pah Tempe Springs to Lake Mead is upgraded and maintained to allow continued existence of all life stages at viable population levels;
3. and barriers to upstream migration of introduced fishes are established, red shiner is eliminated, and other non-native species are reduced.

In March, 2008, the Service completed a five-year review of the Virgin River fishes (USFWS, 2008b). Over the course of the past 30 years, woundfin have generally declined throughout their occupied range and critical habitat. They have been extirpated from the Lower Virgin River. Populations in Utah, particularly those upstream of the influence of red shiner have persisted better than anywhere else. Reduced base flows are of equal concern and likely threaten woundfin to varying degrees. Based on the review, the Service concluded that there was no basis for a change in the current listing status.

In 2009, the Service completed a Spotlight Species Action Plan (USFWS, 2009i) for the woundfin. The target of the Action Plan provides a 5-year goal for woundfin of continued maintenance of the species through multiple captive population, and re-establishment of the species in multiple stream sections in the wild.

Yuma clapper rail, *Rallus longirostris yumanensis* (E)

Status

The Yuma clapper rail was federally listed as endangered on March 11, 1967 (32 FR 4001). The species currently inhabits the mainstem Colorado River in Arizona, California and Nevada; the Virgin River in Arizona, Nevada and Utah; the Gila River in Arizona and the Salton Sea in California. A Recovery Plan was completed in February, 1983 (Yuma Clapper Rail Recovery Plan, USFWS, 1983). In February, 2010, the Service released a draft revised recovery plan (75 FR 6697).

Life History

The Yuma clapper rail is a 14" long marsh bird with long legs and a short tail. Its bill is long, slender, and curved downward slightly. The Yuma clapper rail inhabits freshwater or brackish stream sides and marshlands under 4500' elevation. It is associated with dense riparian and marsh vegetation dominated by cattail and bulrush. It requires a wet substrate such as a mudflat, sandbar or slough bottom that supports cattail and bulrush stands. Most available habitat occurs in fixed locations where natural processes of marsh creation, destruction, and re-creation do not happen because of water management controls (USFWS, 2006). Populations in the south and western U.S. are resident and nonmigratory.

The Yuma clapper rail nests in freshwater marshes. Both sexes assist in incubation and brood rearing. Nests in SE California and SW Arizona are placed in clumps of emergent plants, in the base of shrubs, or in clumps of downed dead vegetation near uplands (USFWS, 1983).

The main food of the clapper rail is crustaceans (primarily crayfish), if available. It is highly opportunistic, eating small crabs and fish, slugs, minnows, aquatic insects, grasshoppers, small vertebrates, seeds, amphipods, other birds' eggs, and occasionally immobilized small birds. Freshwater populations on the lower Colorado River eat mostly crayfish, clams, isopods, water beetles, and small fish (USFWS, 1983).

Critical Habitat/Historic Distribution and Abundance

The Yuma clapper rail occurs along the Colorado River (Yuma, la Paz, and Mojave Counties, Arizona) from Lake Mead to Mexico. Populations in the U.S. are concentrated along the lower Colorado River from the vicinity of Laughlin, Nevada to Yuma, Arizona (USFWS, 2006). The Nevada Natural Heritage program recorded extant nesting sites along the Virgin River near the entrance to Lake Mead, extant individual bird observations on the Muddy River at the entrance to Lake Mead, and historical observation in Las Vegas Valley and northwest of Las Vegas along the border of California. Critical habitat has not been designated for the Yuma clapper rail. Recent

surveys documented the presence of the Yuma clapper rail around Lake Mead near Las Vegas, Nevada, in the lower Virgin and Muddy Rivers of southern Nevada and northern Arizona (USFWS, 2006).

Threats

The primary threats to the Yuma clapper rail are habitat loss and degradation due to changes in historical hydrographs, channelization, and diversion of river flows for agricultural and municipal purposes (75 FR 6697). The Yuma clapper rail prey base, including crayfish, is vulnerable to pesticide and heavy metal poisoning. The threat of selenium accumulation in the rail habitat has been identified as a potentially significant new threat since the recovery plan was written (USFWS, 2006).

Recovery Plan Recommendations

The recovery plan for the Yuma clapper rail, titled The Yuma Clapper Rail Recovery Plan, was published by the Service in 1983 (USFWS, 1983). The Recovery Plan recommended steps needed to reach recovery including surveys throughout the species' range, research into it biological requirements, preservation of habitat on major State and Federal lands, maintaining suitable flows throughout the lower Colorado River, and locating and preserving winter habitat. Approximately 75% of the recovery plan tasks have been completed. The draft revised Recovery Plan states that downlisting of the species may be considered when annual surveys document a stable or increasing population trend over five consecutive years, habitat management plans are in place for all important Federal and state-owned habitat areas, and long-term contracts for water supplies at Sonny Bono Salton Sea National Wildlife Refuge and Imperial State Wildlife Area in California are in place. Delisting of the species may be considered when annual surveys document and additional five consecutive years of a stable or increasing population trend; the amount of habitat needed to support the desired minimum population size in the United States is established and protected, and management plans are in place for that habitat; an assessment of the risks of selenium to the species is completed and protective measures implemented; and a secure water supply for the Cienega de Santa Clara in Mexico is established.

C. DESCRIPTION OF HOW THE ACTION MAY AFFECT LISTED SPECIES OR CRITICAL HABITAT

1. Replace the reference to "natural conditions" or "no adverse effects" for alkalinity to Alkalinity Single Value (S.V.) ≤ 20 mg/L.

EPA finds that the proposed alkalinity beneficial use criterion is based on sound science and will protect the designated aquatic life beneficial use. The Quality Criteria for Water, Gold Book (USEPA, 1986) recommends an alkalinity criterion of 20 mg/L or more as $CaCO_3$ as protective of freshwater aquatic life except where natural concentrations are less. Alkalinity is important for fish and other aquatic life in freshwater systems because it buffers pH changes that occur naturally as a result of photosynthetic activity of the chlorophyll-bearing vegetation.

EPA concludes that adoption of the alkalinity beneficial use criterion may affect, but is not likely to adversely affect the above listed species or their critical habitat. EPA anticipates that the alkalinity criterion will provide adequate protection of aquatic life as stated in the Gold Book (USEPA, 1986).

2. Replace the reference to "natural conditions" or "no adverse effects" for turbidity to a S.V. ≤ 10 NTU for cold water fisheries and S.V. ≤ 50 NTU for warm water fisheries.

EPA finds that the proposed turbidity beneficial use criteria are based on sound science and will protect the designated aquatic life beneficial uses. The 1968 Report of the Commission on Water Quality Criteria (FWPCA, 1968) recommended turbidity values of 10 NTU for protection of cold water aquatic life and 50 NTU for protection of warm water aquatic life. These levels are to protect against sediment filling interstices between gravel and stones which eliminates the spawning grounds of fish and the habitat of many aquatic insects and other invertebrate animals such as mollusks, crayfish, fresh water shrimp, etc.

EPA concludes the adoption of the turbidity beneficial use criteria for aquatic life, may affect, but is not likely to adversely affect listed species. EPA anticipates that the turbidity criteria will provide adequate protection of aquatic life as stated in the 1968 Report of the Commission on Water Quality Criteria (FWPA, 1968).

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